

What's green about irrigation?

By
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The average consumer is often very unaware of the world around them. They are unaware of all the people, work, and technology involved in keeping their world operating smoothly. Everyday people consume food, walk the golf course, and enjoy the flowers in the park. What do these three items have in common? They can all be made possible with irrigation. Irrigation allows farmers to grow crops in dry areas, the golf course to maintain a spotless green, and the park to have colorful flowers each year. People all over the world utilize irrigation to manage their resources in a way that will minimize waste, have positive impacts on the environment and produce higher returns.

In my area of the country, the northern Corn Belt, there are numerous agricultural irrigation systems in place and many new ones installed each year. Most of the soils that are irrigated are highly permeable and have a low water holding capacity. On good years with adequate precipitation these soils can produce an acceptable yield. The problem with taking chances on receiving adequate precipitation is that often the precipitation is sporadic or does not deliver enough total precipitation per year. On years with less than ideal rainfall, the crops are stunted, short, and do not produce an acceptable yield. Taking risks on an uncontrollable production factor like this is not only a bad business decision, it's irresponsible.

Several forward thinking and progressive producers in my area have installed irrigation systems with center pivots being the most common type. They've invested money in a management tool that will pay financial and environmental dividends for years to come. The producers are now able to control water usage on their irrigated acres. With education and observation producers can carefully supplement rain fall with water from an irrigation source. Having the ability to supplement water eliminates one risk of production which increases the probability of producing a high yielding high quality crop. Along with the economic benefit of irrigation, there are numerous environmental benefits. A producer with irrigation abilities can precisely control how much water he supplements to his soil. If he is careful and follows best management practices, he can use the least amount of water and still obtain the most efficiency from the water, soil, and crop. When water is applied in a carefully calculated and timed manor, maximum crop growth can be achieved by applying when precipitation is not meeting the crops needs. Supplementing water correctly will allow the crop to continue to grow at the most advantageous rate for yield production and crop input utilization.

Another environmentally friendly area of irrigation is its role in the correct application and use of nutrients and crop protection products. Virtually all farmers use some sort of fertilizer to improve their crop yields. They may apply their fertilizer in the fall, spring, or during the growing season. Fall applied nutrients are usually applied at a higher rate than spring or growing season applied nutrients to account for any losses before the crop can use the nutrients. These losses can be from volatization, leeching, and denitrification caused by improper application, flooding, or movement of soil. Farmers using irrigation have more nutrient application options than other farmers because of fertigation abilities which allow them to minimize any nutrient

loss. The closer nutrients are applied to time of use by crops, the smaller the chance for loss. If nutrients are applied by fertigation during the growing season when nutrient demand is high, the crop will get what it needs and there is very little chance of nutrient loss. Crop protection products also need to be applied in a carefully controlled amount at the correct time. They must be applied at the correct pest and crop stage to achieve a safe and effective result. Irrigation can be an effective and environmentally responsible method of applying these products. Chemigation allows a producer to treat a target area while reducing drift and impacts on non-target areas.

Using responsible irrigation strategies, producers across the Corn Belt are able to avoid contaminating ground water with excess nitrates that were applied to their field as a Nitrogen fertilizer source. Using Nitrogen has allowed producers to maximize yields and produce high yielding high quality crops. However when excessive amounts of Nitrogen are applied to the ground and the crops are unable to utilize all of the nitrogen it has the potential to turn into a Nitrate (NO_3^-), a mobile leachable form. According to a Colorado State University Extension Publication written by J.R. Self and R.M. Waskom *high nitrate levels in water can cause methemoglobinemia or blue baby syndrome, a condition found especially in infants less than six months. Parents should not let infants drink water that exceeds 10 mg/l NO_3^- -N*. Since many families with many young children in our area draw water from a common underground aquifer it is essential that we manage our Nitrogen inputs very carefully to avoid endangering people within our community. By using irrigation to maximize crop nutrient uptake and avoiding over application of water we can help to protect the water quality in our communities.

Irrigation can help with the correct timing and application method of nutrients and crop protection products, but it also helps with their utilization. A soil that is fertilized and seeded to its full potential is only as good as the weather it encounters during the growing season. If the soil has for example has 200 pounds of nitrogen applied to it, but due to a lack of precipitation, the crop is only able to use 150 pounds, there are 50 pounds of N that can be leech into water sources. If the ground had been irrigated so the crop would have been able to use all 200 pounds of N, there would have been little to no N available to leech into and possibly contaminate water sources. Another way I have seen irrigation improve the utilization of crop protection products is an example I witnessed this spring. Several of our customers applied a pre plant incorporated herbicide, but did not get the rain to activate it. The customers who were not able to irrigate their land and apply water to activate the herbicide ended up making an extra application of herbicide later in the growing season. The producers with irrigation systems were able to get by with less total herbicide per acre.

Reducing pollution of above and below ground water sources is something that irrigation can do also. Since most human and animal drinking water and irrigation water in my area comes from aquifers in the ground, clean uncontaminated water is an important issue. These aquifers are replenished by surface water from rain and snow melt that percolates down through the soil. Keeping them clean and safe is the responsibility of everyone on earth including you and me. Proper irrigation methods will help do that. If irrigation water is applied correctly, it will be applied in a manor and amount so that there is virtually no runoff which can carry contaminants into streams and lakes. Applying the correct amount of water will also prevent the leeching of nutrients like nitrogen and phosphorus down through the soil and into groundwater causing issues in our drinking water or surface waters. Irresponsible water management practices can

lead to problems like eutrophication as well as a variety of other things. Eutrophication or increased plant productivity is caused by a buildup of the primary nutrients (Nitrate nitrogen) which control the amount of plant growth in the lakes and streams. Normally these nutrients are found in amounts which limit plant growth in the lakes and streams. If nitrogen and phosphorus concentrations increase they may no longer be limiting to plant growth which can then increase dramatically. Thus plants grow rapidly. These plants eventually die and through the decay process most or all of the oxygen dissolved in the water gets used to help break down the plant matter. Bacteria involved in the decay process multiply and discolor the water. Often a sewage like smell is given off during the bacterial breakdown of the plant matter. This causes an unpleasant environment for everyone. Examples like this explain why careful and vigilant management of irrigation is necessary.

This essay is in response to the question “What is Green about Irrigation?” According to the wikipedia, “Green” is a broad philosophy and social movement regarding concerns for environmental conservation and improvement of the state of the environment. I believe that those who utilize proper irrigation practices in their production of crops have a great opportunity to be “green”. The green examples I previously mentioned in this essay are a benefit to both the producer and everyone that shares the environment with him or her. I believe that often producers are wary of adopting many “green” practices due to a fear of increased production costs in a time when profit margins are small. However, a producer who has access to irrigation can be both environmentally green and fiscally green. Whether using irrigation for producing crops, maintaining the course green, or making the park beautiful, we all benefit from the “green” practice of proper irrigation.